

CLAIMS

We claim:

- 5 *Sub 7*
1. ~~A method for rebalancing an existing bandwidth~~
allocation to a plurality of devices connected to
a computer system via a bus, the method
comprising: intercepting a failure of a request by
a first device to obtain bandwidth; requesting a
rebalancing module to re-balance the existing
bandwidth allocation to the plurality of devices
connected to the bus wherein the rebalancing
module may change the bandwidth allocations to the
plurality of devices connected to the bus and
request a particular-device to change its
particular-bandwidth-allocation in accord with a
Policy; utilizing, if the particular-device fails
to change its particular bandwidth, an option to
reset the particular-device to release the entire
particular-bandwidth-allocation as part of the
rebalancing; and completing the rebalancing by the
rebalancing module including a generation of
~~optional messages~~
 2. The method of claim 1 where the bus is a Universal
Serial Bus (USB).
 3. The method of claim 1 where the bus is a
"FireWire" bus.
 4. The method of claim 2 wherein rebalancing requires
no input from a user and is transparent to the
user.
 5. The method of claim 2 wherein a hub driver,
connected to the USB, makes the rebalancing
request.

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14. ~~The method of claim 2 wherein the Policy includes~~
that bandwidth resources, required by a most-
recently-used-application, are preferred over
requirements of other applications.

15. The method of claim 2 wherein the Policy includes
that the bandwidth request by the latest device
connected to the USB is preferred over other
requests.

16. The method of claim 2 wherein the Policy includes
that bandwidth resources required by a prescribed
configuration of devices be preferred over
requests that would require undoing the prescribed
configuration.

17. The method of claim 2 wherein the Policy includes
resetting more than one device whereby bandwidth
is released.

18. The method of claim 2 wherein the Policy includes
that more than one device, in the alternative, may
~~be reset to release bandwidth.~~

19. A computer readable medium having computer-
executable instructions for performing the steps
recited in claim 2.

30 Sub B 20. A method for rebalancing an existing-bandwidth-
allocation, to a plurality of devices connected to
a USB, due to a request for bandwidth by a first-
device connected to the USB, said method
comprising: handling a rebalancing event;
determining the existing-bandwidth-allocation;

~~determining a plurality of second-device~~
bandwidth-modes corresponding to a second-device
connected to the USB; requesting the second device
to reduce second-device-bandwidth-usage; and
requesting a second-device-hub-driver to reset the
second-device if second-device-bandwidth-usage is
not reduced and resetting the second-device in
~~accordance with a Policy.~~

21. The claim of method 20 wherein a message is generated to indicate end of rebalancing.
22. The method of claim 21 wherein if the bandwidth request by the first-device is greater than an allowable-first-device-bandwidth, rebalancing is completed with no optional bandwidth reductions.
23. The method of claim 20 wherein the second-device-bandwidth-usage reduction request is sent to a second-device-driver, and wherein the second-device-driver dynamically adjusts a second-device-interface.
24. The method of claim 20 wherein the second-device-hub-driver generates the rebalancing event.
25. The method of claim 20 wherein the request to reduce second-device-bandwidth-usage specifies a desired-bandwidth-usage in accord with the plurality of second-device-bandwidth-modes.
26. The method of claim 24 wherein furthermore, if the second-device-bandwidth-usage is not reduced, a request is made to reduce a third-device-bandwidth-usage after determining a plurality of

third-device-bandwidth-modes corresponding to a third-device.

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27. ~~The method of claim 20 wherein the Policy includes preferences for allocating bandwidth based on other devices being used.~~
- 10 28. The method of claim 20 wherein the Policy includes preferences for allocating bandwidth based on a time when rebalancing event is generated.
- 15 29. The method of claim 20 wherein the Policy includes a preference for allocating bandwidth based on a priority value associated with the first-device.
- 20 30. The method of claim 21 wherein if no reductions are possible by the plurality of devices connected to the USB the message to indicate rebalancing is complete is generated.
- 25 31. The method of claim 20 wherein the method is carried out by a user-mode application which interacts with a plurality of device drivers through a user-mode to kernel-mode interface.
- 30 32. The method of claim 20 wherein the method is carried out by a kernel-mode module.
33. The method of claim 31 wherein the user-mode to kernel-mode interface is a "WMI" interface.
- 35 34. A computer readable medium having computer-executable instructions for performing the steps recited in claim 20.

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35. An USB-compliant device with dynamic bandwidth adjustment capability in an isochronous data transfer mode wherein said device is capable of executing a command to change its current-bandwidth-usage setting to a specified-bandwidth-usage setting while receiving and/or sending data.

36. The device of claim 35 wherein the device terminates pending data transfers at its current-bandwidth-setting in response to a request to change to the specified-bandwidth-usage setting.

Sub A5 37. ~~A method for rebalancing an existing bandwidth allocation to a plurality of devices connected to a computer system via a bus, the method comprising: responsively to a failure of a request by a first device to obtain bandwidth by conventional means; requesting a rebalancing-enabler to re-balance the existing bandwidth allocation to the plurality of devices connected to the bus wherein the rebalancing-enabler may change the bandwidth allocations to the plurality of devices connected to the bus and request a particular-device to change its particular-bandwidth-allocation in accord with a Policy; utilizing, if the particular-device fails to change its particular bandwidth, an option to reset the particular-device to release the entire particular-bandwidth-allocation as part of the rebalancing; and completing the rebalancing by the rebalancing module including generation of optional messages.~~